



Percutaneous Nephrolithotomy (PCNL)

What is PCNL?

It is an operation that uses telescopic instruments passed directly into the kidney through a small incision in the flank to break up and remove kidney stones. Urinary stones, especially those causing obstruction, can lead to pain, blood in the urinary tract, infection, and in some cases, kidney dysfunction. PCNL is often performed for larger kidney stones (>2cm).

This operation is performed in a hospital under anesthesia, and most often the patient will stay overnight. Often preceding this surgery (by several hours to a day) is the placement of an access tube into the kidney, called a nephrostomy tube. This is often done by the interventional radiology team (physician radiologists that perform minimally invasive procedures). This initial tube will allow your surgeon to access to the internal portion of your kidney containing the stones. Several special tools are then used to break up the stones and clear them from the kidney or ureter.

There is a small chance that PCNL may not be able to successfully remove all stones as a result of either size, number, or location of the stones within the kidney. Therefore additional treatment may be required, including a “second-look” PCNL, whereby the existing nephrostomy tract is utilized in a less invasive manner to remove remaining stones.

Alternatives to PCNL include watchful waiting, as well as other stone surgeries such as shock wave lithotripsy or ureteroscopic laser lithotripsy, discussed in the office if relevant. Watchful waiting runs the risk of further stone complications, and other methods of treatment may have limitations in treating your stones.

Anticipated benefits include eradication of the kidney (and possibly other urinary tract) stones, though sometimes, for a number of reasons, complete treatment of the stones is not always feasible, and may require additional surgery.

Ureteral stent. Sometimes, a stent is placed after PCNL in order to promote the passage of residual small stone fragments and ultimately protect the kidney in the immediate post-operative period. These stents are temporary and must be removed, typically in less than 2 weeks but sometimes longer. These must be removed in order to prevent stone encrustation, infection, or even kidney damage.

Nephrostomy tube. A nephrostomy tube drains urine directly from your kidney into a drainage bag. It is routinely placed to tamponade bleeding from the tract between the skin and the kidney. Urine from the kidney is often blood-tinged and will clear over the ensuing days following surgery. There is a possibility that you will be discharged from the hospital with the nephrostomy tube as deemed necessary by your surgeon. The nephrostomy tube will then be removed in the office at the bedside generally within 1-2 weeks following surgery.

What are the risks and typical side effects?

Bleeding. As with any operation there will be some bleeding. This may persist to some degree, for up to a few weeks in the urine, or while a stent remains in place. It is often fairly minimal. You should hydrate aggressively if bleeding becomes heavy. In rare cases, significant injury to the kidney's blood vessels may occur, necessitating embolization of the bleeding vessel by interventional radiology. This can result in loss of function of a portion or even all of that kidney. In an extreme situation, an open operation to correct the problem or even remove the kidney entirely may be the only way to control the bleeding. Transfusion rates range from around 2% to 12%.

Infection. A preventative antibiotic is given prior to the surgery at the hospital, and infection rates are usually less than 5%.

Injury to the urinary tract. This is rare and may result from scope or other instrument damage to, or puncturing of, the inside surfaces of the urinary tract. In such cases, urinary drainage tubes may be required for longer than normal duration.

Injury to local structures.

- Pneumothorax (collapse of the lung): The kidneys lie close to the chest cavity. During surgery or placement of the access tube it is possible to enter the lung cavity and cause collapse of the lung. It may be necessary to place a tube (lung

cavity drain) in the side of the chest wall to allow the lung to re-inflate. The tube will usually be removed in a few days.

- ❑ Liver or spleen injury: Kidneys are adjacent to these organs on the right and left, respectively. During placement of the initial access tube or scope into the kidney, either organ can be injured, requiring additional intervention. Open surgery may be necessary for these repairs, and a general surgeon might be called to assist with this problem.
- ❑ Small intestine or colon injury: The kidneys lie in close proximity to portions of the small intestine and the colon. If the scope inadvertently exits the kidney, it can cause injury to these structures. If immediately recognized, we would terminate the procedure immediately. An open abdominal operation (sometimes assisted by a general surgeon) would then be performed. In very rare circumstances, a significant injury could necessitate a temporary colostomy.

Urinary irritation. Urinary bother such as frequency, urgency, incontinence, bladder or flank discomfort with urination may last for several days following surgery, but can also persist while a stent remains in place.

Anesthetic and other risks. Significant events such as heart attack, stroke, even death may occur as a result of any anesthetic, though such risks are extraordinarily low, especially if properly evaluated by your primary physician before surgery if indicated. Should you develop any pain or swelling of your lower legs and ankles following surgery, notify your doctor's office immediately, as this may indicate a blood clot in your leg (deep vein thrombosis or "DVT"). If a blood clot moves to the lung this could be immediately life-threatening, and usually presents with shortness of breath and/or painful breathing.

What are preparations for surgery?

Please have nothing to eat or drink after midnight prior to your surgery. If you take blood thinners, your surgeon will discuss the cessation of this medication prior to your surgery. Arrangements with interventional radiology for nephrostomy tube placement will be made.

What happens during the surgery?

You will have a general anesthesia. The access that is usually provided by the interventional radiology team prior is used to place our telescope into the kidney where the stone resides. Various forms of energy, such as ultrasonic and laser, are used to

break up and remove the stones. A ureteral stent and/or nephrostomy tube may be placed at the conclusion.

What happens after the surgery?

Most patients will stay in the hospital overnight for observation and pain management. In the days following surgery, it is normal to feel some urinary bother and pain in the flank where the incision was made.

Resuming activities

You can go back to work when you feel able, usually within one to two weeks, though many patients don't feel like being very active if a stent or nephrostomy tube is in place.

You may drive when you feel able and are not under the influence of any medications.

Follow-up

Your doctor will arrange a follow-up visit, sometimes for stent removal procedure, or to arrange additional stone procedures. Stent removal in the office is done with a small scope passed into the bladder and is usually very quick.

For any concerns related to excessive bleeding (such as blood clots preventing passage of urine), fever or possible infection, inability to urinate, or any other concern, do not hesitate to call our office for advice or instruction.